So Dakota

Mixed study

1966

	? Ischiopubis (dist.)	humerus (dist.)	ulna & dist. tetrapodise	? astragalus dist
Neophrithops americanus	13.2 / 14.5 / 15.0	22.0 ~~22.2~~ / ~~22.7~~ / 23.7	— 10.8 —	~~14.6 / 15.2 / 16.5~~ slt
Neoceratops edmontonensis	~~18.0 / 19.6 / 20.8~~ 18.0 / 19.9 / 20.8	~~33.1 / 35.8 / 35.5~~ 31.3 / 34.2 / 36.9	~~14.6 / 15.6 / 16.8~~ 14.8 / 15.7 / 16.8	~~21.4 / 22.5 / 24.1~~ remeasured 20.9 / 22.7 / 25.6
Plio Paleobos N. Mex cantrocarus	16.0	28.0	—	19.0 less than Neoceratops large ? Neoph. amer.
Mio P. howardae Neb Watrous 1936	—	—	—	20.4 size near equivalent of N. edmontonensis
Mio P. rosatus So. Dak Hatcher Compton 1938	—	—	15.8	— size OK for Neoc. edmontonensis
Mio Nephrocatops Neb. vetustus Watrous	—	17.2 femur, medium Neoceratops	—	— size marked by [illegible] than either Neoc. or Neoph. amer.
Plio Nephrocatops So. Dak + Neb. dakotensis Compton	—	20.7 closely resembles N. amer. (slight difference)	—	— size slightly less than Neoph. amer.
Low Mio Sharps fm. So Dak	13.2	—	—	— size within limit of Neoph. amer.
ratio Sharps / Neoph. amer.	100% to min. 91% to aver.			
ratio N. dakotensis + ratio to Noph. amer.		93.2% to min 91% to aver.		
ratio N. vetustus / N. amer		77.5% to 85.7%		95.3 to min, 90.7 to aver.
ratio howardae / neoceratops				
ratio Sharps / ambrosus	81.3%	61.5%		
" N. vetus / "		74.1%		
" " dakot / "				
" " rosa / neoc.				106.7 to max, 101.2 to aver, 94.1 to min

18.5 : 240 = X : 251.7

240X = 19.4

$$\begin{array}{r} 251.7 \\ -\ 19.4 \\ \hline 232.3 \end{array}$$

$$\begin{array}{r} 251.7 \\ \times\ 18.5 \\ \hline 12585 \\ 02014 \\ 251.7 \\ \hline 4656.45 \end{array}$$

$$\begin{array}{r} 19.4 \\ 240\overline{)4656.4} \\ 240 \\ \hline 2256 \\ 2160 \\ \hline 964 \\ 960 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 2.6 \\ 21.4 \\ \hline 90.4 \\ 2.6 \\ 19.5\overline{)49.84} \\ 39.0 \\ \hline 10.84 \\ 9.36 \\ \hline 1.48 \\ 1.17 \\ \hline 0.31 \end{array}$$

19.5 : 21.4 = 2.6 : X

Sizes of various fossil Aegypiines Relative to each other

	Br. distend Humerus	Nt, extend. Ulna	Br. distend Tibia	Br. distend Tarsus
1 Neophrontops americanus aver.	22,7 (22.2-23.7)	10,8 (10.4-11.9)	14,5 (13.2-15.0)	15.2 (14.6-17.5)
2 Neogyps errans aver.	33,8 (32.7-36.5)	15.6 (14.8-16.8)	19.6 (18.0-20.8)	22.5 (21.4-24.1)
3. Palaeodonsumbrosus	28.0	—	16.0	19.0
4. P. rosatus	—	15.8	—	—
5. P. howardae	—	—	—	20.4
6. Neophrontops dakotensis	20.7	—	—	—
7. Neophrontops vetustus	17.2	—	—	—
8. Sharps fm. spec.	—	—	13.2	—
9. Neophrontops valleyensis	—	—	—	17.4-19.6

Ratio

P. rosatus/Neogyps	—	107 to min 101% to av. 94.3 to max	—	—
P. howardae/Neogyps				95.4 to min 90.7 " aver 84.5 " max
P. howardae/P. umbrosus		—		107.9%
P. umbrosus/Neogyps	84.7 to min 82.9 to aver 76.7 to max	—	89.0 81.6 77.0	88.9 to min 84.5 " av 79.0 " max

Neoph. dakotensis / N. amer.

Neoph. vetustus / N. amer.

Sharps fm / Pal. umbrosus

Sharps fm / Neogyps

Sharps fm / N. amer.

93.3 to min
91.3 to av
87.4 to max
N. dak humerus / Pal. 74.3% umb.

77.5 to min
75.7 to av.
72.6 to max
N. vetus humerus / Pal. um. 61.5%

82.5%

73.4 to min
67.3 to av
63.5 to max

100 — 91 — 88% to min av. max

Comparative Measurements of Pygostyles

	gen? macdonaldi	Palaeobrous umbrosus	Palaeobrous lowardae	Palaeobrous woodwardi	Xiaotingia zhengi		
					Min.	Mean	max
Br. distal end Humerus	—	28.0 mm	—	—	31.3	34.2	36.9
Br. dist. end Tarsometatarsus	—	19.0	20.4	—	20.9	22.7	25.6
Length ulna to tricip. ~~pitch~~	—	—	—	241	221.0	225.0	232
Br. dist end Tibiotarsus	— 13.2	16.0	—	—	18.0	19.4	20.8
Depth ext cond fib Tibiotarsus	— 9.2	12.0	—	—	11.8	12.7	13.4
Depth int. cond fib Tibiotarsus	— 9.3	13.0	—	—	12.8	13.7	14.5
Ratio depth ext cond. to br dist	69.6	75.0	—	—	61.5	66.0	68.3
Ratio depth int cond to Br dist	70.6	81.3	—	—	68.0	71.0	72.5
Ratio ext to int. depth	99.1	92.4	—	—	90.0	93.6	96.3

Miocene Talkeetnan cont'd
Palaeoheriax gervaisii (M E) 1871
tarsus (aquitanian France)
Palaeobos rosatus Miller + Compton 1939 condr
ulna Rosebud, S. Dak., Bennett Co., Lower Mio
Palaeobos howardae Wetmore 1936
tarsus Mid Mio. Nebraska
Neoplerontops vetustus Wetmore 1943 Condr p. 229
humerus Mid Mio, Nebraska
Thegornis musculosus Ameghino 1895
tarsus Mid Mio, Argentina (Sta Cruz fm.)
(subfamily circinae)
T. debilis Ameg. 1895
tarsus same data as above
} see Circus

* tibia of B. typhonus
br. of condyles 15.0
depth at " 10.8
" ext " 11.0 ap.
tendinal bridge wide internally + higher on shaft
condyles appear higher
as it is Law, Mio, why not B. alen described from Nebraska
S. Dak Law 13.1 9.3 9.4

The So. Dak tibia has short condyles, low bridge

R. rosatus ulna is as large or larger (7% say authors) than Neogyps errans. The latter tibia is 18.0 – 20.8 breadth distally near the proximal articulation specimen is only 13.1 ←
Depth of dist. end of N. errans is 13.2 – 14.1 (So. Dak is 9.1 or 9.3 69% – 70%)

P. umbrosus tibia
br. dist end 16? 70% =
depth 12 – 13 } 75+

71
74
70.7
70.0
67.5
69
66
7) 484 / 69.7 average N. errans
42
68
63.0

depth/br distal tibia

Falconiformes - Miocene

Aquilavus depiodator M-E, 1871 / tarsus
" prisons M-E 1871 tarsus + tibia
Very different Trans So. Dak. Bone
Trance flares both left + rt of shaft + rather gross.
with enlarged int. condyle (protruding well out'ly)

Buteo alex (Wetmore) 1924 Harrison Beds
Tarsus Arikareean Pow. Agate Spg. Nebraska

*OVER Buteo typhonus Wetmore 1923
a dist. tarsus Snake Creek Up. Mio. Nebraska
this known from low Mio * see OVER 1928
Buteo contortus (Wetmore) 1923
& tarsus as above ↑

Palaeastur atavus Wetmore 1943 Condor p. 230
rt. tarsus. Arikareean, Nebraska

Hypomachrus exectus (Wetmore) 1923
d (unbiting) left tibia Mid. Mio, Sheep Cr., Neb.

Hieraëtus edwardsi (Sharpe) (see M.E. Aquilaminuta) tibia up-Mio France
1871
Too small for S.D. Bone, deeper, narrower
inter-condylar sulcus, higher tendinal
bridge, Posterior median edges of condyles
approach each other more gradually
so higher on shaft + come close together
in middle

Haliaetus piscator ME 1871
carpus up. Mio France - too large
+ Haliaëtus differ anyway

Aquila delphinensis Gaillard 1938
tarsus up Mio, France
" pennatoides Gaillard 1935
tarsus up Mio France

Milvus deperditus ME 1871
tarsus Aquitanian France

Promilvus ofenus Wetmore 1923
Tarsus + phals, Arikareean, Nebraska

Promilvus incertus (Gaillard) 1935
tarsus aquitanian France

Promilvus floridanus Brodkorb 1958 Condor p. 38
tarsus Pow. Mio. Thomas Farm Fla.

P. ofulens Wetmore 1958
rt femur Thomas Farm Fla.
" bradleyi Wetmore 1958
tarsus same place same ref. op. cit.

a Oligocene

Vultur (Cathartidae)
Phasmagyps patritus Wetmore
dist. end tibia (Colorado)
1927 Pur Colo. Mus N.H. 7/3
de
Palaeogyps prodromus Wetmore
dist. end tibia (Cathartidae) (op. cit. p. 5)

Climacarthrus incompletus Ameghino
Tarsus 1899 (Deseado) Patagonia

Cruschedula revola Ameghino
proximal scaph. see Amg. 1905 p
An. mus. nac. Buenos Aires V. 13/54

Buteo pangeti Wetmore + Case
Eranium 1934 Lower Brule fm
So. Dak.

Buteo fluviatilis Miller + Sibley
dist. tarsus, Brule Colo. 1942 Con 12
p. 39

Buteo antecursor Wetmore
tarsus 1933 Brule fm. Wyoming

Palaeoplancus stromeri Wetmore 1933
Part skel, Oreodon beds Brule fm
Wyoming. Mid Oligo.
Noleg bones

p. 160 Lucas 1821 gully so side Sharps cut off Rd. So Dak S. Mus # 5359 SW¼ Sect 9, T. 39 N., R. 43 W., in mid of Sharps formation

1982 gullies on both sides of Sharps cut off road mid Sharps fm 5360

N. ½ of sect 17, T. 39 N., R. 43 W. in mid of Sharps fm

Wounded Knee fossil localities

Lowell Reid Macdonald, 1963 The Miocene faunas from the Wounded Knee area of western So. Dak., Bull. Am. Mus. Nat. Hist. vol 125 art. 3

pp. 141 — 238

formerly recorded from Sharps fm.: 4 reptile; 64 mammal taxa

formerly recorded from Lucas 1821, 13 mammals p. 160

" " " 1982, 19 " p. 160

Sharps placed at bottom of Arikaree (lower Miocene) group of Miocene

Megapalaeolodus connubeus

Paranyctea magna

Dendrochen robusta

Querquedula integra

Palaeobasis vsatus

Buteonine sp. (smaller)

Ortalis pulicaris

Tympanuchus ? futuri

Miotyx teres

Thus dakota

34 miles from Sharps ESE to Flint Hills

The scant avian representation makes impossible any critical comparison with the better known and slightly later Miocene Flint Hill fauna. The relationship of Miotyx aldeni to the Flint Hills M. teres is clearly indicated. There is also a close harmony for the Neb. Meltmine (under 1930: 153, 1933 & 1943

Up Oligo. (up Brule) Washington Co. So. Dakota (near Rockyford)
Quotornis aramiellus Wetmore (Lambkin) Nebraska
Bathornis geographicus Wetmore (Carnivore)
Badistornis aramus Wetmore (Rumpkin)
Eathena cursor (mid oligo near Scenic)

Condor 1956 (B. celeripes Brule Up Oligo, Nebraska)
Vol 58 p 2 Palaeonossa ~~sp~~ senectus Wetmore.
4 Bubo ~~aut~~ cursor ~~Wetmore~~ → W So

Low Oligo (B. veredus Low Oligo, Chadronian / Colo., Wyo, So. Dak.)
Palaeocnex pax Wetmore, Colo. (gallinule)
Palaeogyps prodromus Wetmore (Heron) Catharista Colo.
Oligo (Age?) Procnex brevipes S. So Dak.
L. Oligo. Chadron - Phasmagryps patutus Wetmore + Ibis Colo.

Mid Oligo Brule, [Niobrara Co., Wyo.]
Palaeoplancus sternbergi Wetmore
Butes fluviaticus Miller + Sibley (Harpus) Colo.
Butes gracilis Brule So. Dak (Washabaugh Co.) Crane

Palaealectoris incertus Wetmore Condor 1930 p. 152

Cf Canachites canadensis (= Tetrao) but much smaller

① Crista superior more developed — & free margin runs ~~downwards~~ rounding

② Depression below caput humeri less deeper impressed

③ Prox margin incisura capitis higher on side of caput humeri

④ Tuberculum inferius rel. broader

Coll'n Chas. Ortis Agate Springs 1928

↑ Pronounced depression below head sharply delimited except toward pneumatic foramen where it is open, margin without break with shaft

Head elongate, rounded, merges as pronounced prominence

Crista superior narrow flat flattened toward center narrowed at extreme end, rounded in lateral outline

Bicip. surface smoothly rounded

Coracohumeral groove deep in ground ext., becomes rapidly shallow internally, disappears just beyond median axis of head

Incisura capitis deep but makes only slight notch on anterior margin of head

Tuberculum ext elongate but low (only slight projection)

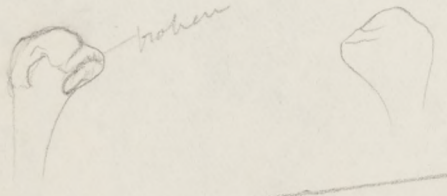
Pneumatic foramen small

Gr. Br. head 11.1 mm

Palaealectoris sp from Calvert fm Maryland - Libna

Proxbreadth 11.1 mm.

Lw Miocene (Harrison) Nebraska



humerus of J. R. Macdonald from Ol. 50 (Brule) Wounded Knee, So. Dak.

15.0 prox end

11.2 dist end

Look up Palaeonossa ~~sp~~ secta Wetmore Condor Vol 58 (1956): 334

Wt Ol 50 (Brule) So. Dakota (Pennington Co.)

dist end humerus

Bates ales – Arikaree form. Lower Harrison beds LOW MIO.
Sioux Co. Nebraska Agate Spgs formation #2

B. typhonis ?, – Referred Tibia
Low Harrison Stenomylus quarry LOW MIO
2 mi SE Agate Spgs, Neb.

Palaeadus ataxus – Arikaree form, Low Harrison beds LOW MIO
Sioux Co., Stenomylus quarry, 2 mi SE Agate Spgs

Rita Pumilio ffemur – Arikaree form, Low Harrison beds LOW MIO
Sioux Co. Neb. Agate fossil quarry.

Perognat Leaut Borcorhalis tantala – Arikaree formation Low Harrison Bds. LOW MIO
tibia
Sioux Co. Neb. Agate Spgs quarry SW side of Carnegie Hill

Testudinine Pharaunt Palaeoclemmys incertus Arikaree fm., Low Harrison Beds LOW MIO
Sioux Co., Agate Spgs Quarry Neb.

Oysteratheres
Paractinonis perpusillus – Harrison fm. LOW MIO
Carnegie Hill, Agate fossil quarry, Sioux Co. Neb

Lower Miocene (Harrison fm) – Neb.

✓ Paractiomis perpusillus Wetmore 1930 (Cook) Oligbaatrha

✓ Palaeoalectoris incertus Wetmore " (Brown

✓ Ortalis tantalai Wetmore 1933

✓ Palaeastur atavus Wetmore 1943

✓ Buteo ales Wetmore

✓ Buteo typhaeus Wetmore (type from Up. Mio) also in Low. Mio.

✓ Promiluo effera Wetmore [K. & C.]

L. Mio. (Rosebud) So Dak. Flint Hill

Stur dakota

Miortyx texes Miller

Tympanuchus stirtoni Miller

Ortalis pollicaris Miller — carpus

Palaeotonus rosatus " & Compton

Dendrochen robusta Miller +

Anas integra Miller —

Paracypna magna

Nyctalaeobedis comptus

see also Buteo humerus (mand.) & Tibia

	Br. dist. humerus	Br. shaft tarsus	Br across trochlear tarsus	Length ulna from tuber. olecran.	Br prox. ulna	Br shaft	Br dist. tibia	depth ext. cond. tibia	depth int. cond. tibia	Ratio ext. cond. to Br	Ratio int. cond. to Br	Ratio ext. to int. depth
Pal. howardae			20.4			least 9.5						
Pal. notatus				241.0	15.8							
Pal. umbrosus	28.0	middle 10.0	19.0	—	—	near prox 11.0	16	12	13	75.0	81.3	92.4
Shafi's fm.,		—	—	—	—	—	13.2	9.2	9.3	69.6	70.6	99.1
Neogyps errans	36.9	12.8	23.1 24.4	22.5	15.5	10.5	20.8	12.8	14.2	61.5	68.3	90.0
	32.4	11.2	25.1	22.5	15.5	9.9	18.0	11.9	12.9	66.2	71.7	92.3
	33.5	9.1	21.4	22.1		9.9	19.2	13.1	13.6	68.3	70.7	96.4
	34.8	10.7	22.9	22.3	14.8		19.6	12.8	13.7	64.7	69.9	92.7
M = 34.2	34.7	9.6	22.2	23.2	~~14.6~~	10.6	20.0	13.4	14.5	68.0	72.5	92.4
	33.8		22.6	11127 / 225 =	15.8	11.0	20.2	13.1	14.2	64.9	70.4	92.3
	35.8		22.2		16.4		19.6	13.2	14.1	67.4	71.8	93.7
	34.3		22.1	M =	784 / 15.7		20.3					
	34.5		23.5				18.2	~~13.7~~				
	34.5		21.0				18.8	12.7	13.2	67.5	70.3	96.2
34.2 / 34.9 / 35.6	35.6		21.8				20.2	13.3	14.2	65.7	70.3	93.9
33.1	33.1		24.3	M = 22.72			18.8	~~13.5~~	—	—	—	
	34.5		23.7	45.42 / 20 / 40 / 34			20.0	13.1	13.6	65.5	68.0	96.3
32.4	32.4		21.0	40/14		M =	18.8	12.8	13.4	68.0	71.3	95.4
33.9	33.9	9.2	20.9			19.4	20.0	13.2	14.2	66.0	71.0	93.0
	36.0		22.1 23.0			17) 329.8 / 17 / 19.3	19.4	12.7	13.6	65.5	70.0	93.3
16) 549.9			23.3 23.1				18.0	~~11.8~~	~~12.8~~	65.4	71.3	92.3

	Br	Depth ext	Depth int	Depth/Br ratio ext	Depth/Br ratio int	Br/Depth ratio int
	14.2	11.4	11.4	80.3	100	80.3
	13.3	10.4	10.0	78.3	96.0	
	13.0	10.4	10.3	80	106.8	
	13.6	10.6	10.6	78	100.0	
	13.5	10.7	10.7	79.3	100.0	
	14.2	11.2	10.5	78.9	105.3	
	13.7	10.7	11.0	78.3	97.4	
	14.2	11.5	10.8	81.0	106.5	
	13.2	11.0	10.4	83.3	105.7	
	14.0	11.6	10.6	82.8	108.2	
	12.7	10.1	10.2	79.6	99.3	
	13.4	11.3	11.0	81.3	102.8	
	14.0	11.0	10.8	78.6	102.0	
	13.5	11.0	10.2	81.5	107.8	
	14.9	11.2	11.2	75.3	100.0	
	13.3	10.6	9.6	79.7	110.5	
	14.3	11.4	10.8	79.8	105.6	
	13.5	11.3	10.8	84.7	104.6	
	13.6	10.9	10.3	80.3	105.8	
	14.7	11.2	11.0	76.2	96.7	

	Eagles	Hawks	Falcons					ostrich							
	1791	1367	1073	1660	1097	1015	994	1081	14.80	1498	468	226	232	1818	1817
Fr brit	22.7	19.8	23.7	26.3	12.4	13.8	9.3	11.2	8.7	13.1	22.3	20.1	19.1	20.5	18.5
depth ext	14.2	14.5	15.1	15.0	8.8	9.0	7.5	7.8	5.9	8.7	15.5	15.6	14.9	16.2	16.4
depth int	15.2	13.6	16.3	14.8	8.8	8.8	7.2	8.0	6.2	9.2	15.6	18.0	14.6	16.3	16.7
															shape influences
Ratio ext/~~Br~~	63.6	73.3	64.7	74.9	71.0	65.3	80.6	69.6	67.7	66.4	69.5	78.7	78.0	78.9	88.6
Ratio int/br	67.0	68.7	68.9	72.3	71.0	63.7	92.5	71.4	71.2	65.6	70.0	89.9	82.8	79.5	90.3
Ratio ext/int.	93.5	106.5	92.4	101.5	100.0	102.3	104.1	97.5	95.3	94.6	99.4				

Ratio depth to br. dist. end
T. leiodactylus 18.2/93.5 = 19.6

		65 [4p.] 73.8	68.6	74.6-81.0
		N. errans	Palaeobos umbrosus	N. amer.
Br. distal end	13.2 mm	18.0-20.8	16.0	13.2-15.2
Depth " "	9.2 mm	13.2-14.1	—?—	10.7-11.3
Depth mt condyle	9.3 mm		13	
" ext "	9.2 mm		12	
br shaft	9.7	13.7	11.4	
depth shaft	4.9	6.8	6.5	

(midway of fibular facet)) from illus

T. leiodactylus resembles Neogyps errans in depth relative to br. distal end (69.6%) N. errans average 69.7% of 7 published, ranging from 66% to 74%. This ratio in Palaeobos umbrosus is 75%

Tendinal bridge is very similar to Neogyps in angle (less retical than in Buteo) but upper edge of canal is more centrally located in this respect more like Palaeobos umbrosus, however, the lower part of the canal slants upward over the mt. condyle (as in Neogyps) whereas in Palaeobos it is horizontal and more medial (ultim.)

Main difference from Neogyps, other than much smaller size) is less inward flare of internal condyle, less prominent int. papilla. This probably affects the median position of the canal (deep) groove from prox. edge of canal runs vertically about parallel to shaft & slightly internal to center.

In Buteo groove slopes int'ly before going up shaft groove less deep in Neogyps & more central (but slightly relative to external condyle, however, the two are more nearly alike (median to the condyle & not above it) the So. Dak. bone is more median, however) ~~coupled~~

Three spp of Palaeobos

P. umbrosus (Cope) tibia avail. Low Plio Br. 16.0 (as compared with 13.2 for new fossil)

P. howardae Wetmore tarsus (dist) Mid Mio larger than P. umbrosus

P. rosatro Miller & Compton ulna Low Mio (as large as Neogyps errans)

Neophrontops dakotensis compton tarsus Low Plio

N. vetustus Wetmore humerus Mid Mio smaller than dakotensis

dist br. 19.2

M. br 8.2

tarsus — larger than N. amer.

Avifauna from Mio of Nebraska
Condor 45: 229-231 1943
Neophrontops — Wallecitos

$$
\begin{array}{r}
69.6 \\
132\overline{)9210} \\
792 \\
\hline
1280 \\
1188 \\
\hline
920 \\
792 \\
\hline
128
\end{array}
$$

$$
\begin{array}{r}
68.6 \\
16\overline{)1200} \\
96 \\
\hline
240 \\
128 \\
\hline
112 \\
96 \\
\hline
16
\end{array}
$$

$$
\begin{array}{r}
72 \\
15,10\overline{)10,85,0} \\
1050 \\
\hline
1800
\end{array}
$$

$$
\begin{array}{r}
70.4 \\
132\overline{)9300} \\
924 \\
\hline
600
\end{array}
$$

Tibia

	br dist	depth ext cond	depth int	ratio ext br to dist	ratio int br to dist	ratio ext br.	ratio ext and
Spilornis 1949	13.1	8.6	9.1 9.7	4.3 65.6	69.5 % 49.4		94.5
Sharpsform.	13.2	9.2	9.3	9.5 4.9 69.5	54.5	70.4 81.3	99.1 92.4
C. antros.	16.0	12.0	13.0	9.0/6.1 75.1	67.8	70.3	96.7
Neo. errans E5894	18.5	12.7	13.4	12.5/6.8 68.7	54.4	72.8	93.9
C 3547	18.4	12.5	13.3	11.6/6.9 68.1	59.5		88.8 100.5
Buteo 226 1818	20.1	15.6	17.6	77.7			94.9
Accipiter 232 1817	20.5 19.0 18.5	16.2 14.9 16.4	16.1 17.7 15.7 17.1	8.2 79.1 78.5 88.7	64.5		96.0
Accipitype D 8440	14.2	11.0	10.6	8.3/5.6 77.5	67.4	74.6	103
P 2094	13.6	10.2	10.4	6.4/5.6 76.3	66.7	77.6	98.2
B1 10 15	13.8	9.1	8.8	8.8/5.0 66.0	57.4		
994 Circus	9.4	7.5	7.2	5.3/2.8 79.7	52.9		
1097	12.4	8.85	8.85	8.1/4.8 71.3	54.3		
Tinnunculus	8.45	6.0	5.6	5.4/2.8 70.9	51.8		
ac 468	22.4	15.3	15.6	68.3			
cal 1367	19.8	14.5	13.6	73.3			
1660	20.4	14.9	14.5	12.6/7.7 73.1	61.2		
1791	22.5	14.3	15.25	63.7			
701	11.0	7.6		6.2/4.0 68.3	64.4		
712	9.6	6.8		6.2/3.9 68.4	62.7		

Circinal
Circus
Gymnogenys

Circaetinæ
Terathopius ecaudatus
Circaetus gallicus Asia
Spilornis Asia
Dryotriorchis spectabilis Nigeria Cameroon
Entriorchis Madgascar

Senegal, Egypt. Sudan. Tanganyika Ethiopia

cinereus and fasciolatus cinerascens

Aegypinæ
Sarcogyps India
Torgos Egypt
Trigonoceps Senegal
Gyps Europe, Africa, Asia
Pseudogyps India, Africa
Necrosyrtes Africa
Neophron Europe, India, Egypt

Mio

Phasianidae

Br. Rox end of So. Dakota = 19.5 (at least)
Nasonal fossil like Oreatyx
(Cyrtonyx is round)

Odontophorinae quail

Miortyx teres A. Miller 1944

pur humerus Low. M. Rosebud, So. Dak. 12.9 mm. Br. head

Cyrtonyx coahi Weitmore 1937 [Miller says size same as Miortyx]

dist humerus Mid. Mio. Nebraska

Phasianinae pheasants

Palaeoperdix 4 sp. see M E + Deperet

up. Mio. + Plio, Asia

[humerus, ulna Deperet 1887]

Miophasianus 5 sp. M E + Lydekka

up Mio + Plio

Miogallus longaevus (von Ammon 1918)

Cracoid U. M.

Prolectron 2 sp. Gaillard 1938

up Mio + Plio France Ennouchi 1930

humerus + tarsus

Oligocene

Odontophorinae

Nanortyx incertus Wetmore 1943

Low Ol. So. Dak.

Phasianinae

Schaubortyx kelleri Cracraft 1973

[Genus Brodkorb] France up-O.

Go. Dakota museum collection study

Tetraoninae Grouse

(h. bur head 11.1 mm)

Palaeoalectoris incertus Wetmore

humerus Low. M. Arikareean Neb, Trans carpometacarpus

Tympanuchus stocki Miller 1944 Kay Trans

tarsus Rosebud fm, L. M. Mio So Dak [Clearly a grouse, not a quail]

Archaeophasianus roberti (Stock) Stirton 1935

tarsus Oreg. U. Mio

A. miocaenus Shufeldt 1915

humerus + fem. U. Mio. Nebraska

Miller says does not have configuration of quail (probably a grouse he says)

Neogene
So. Dak. humerus
is definitely not grouse
as it is too deeply
excavated under the head.
(very shallow in this
area in grouse - Incidentally
Pendragapus, Centrocercus
Pedioecetes, Bonasa, Tympanuchus)

Galliformes
Miocene

Cracidae (Palaeortyx)

Taoperdix gallica (M-E) 1869
skel., Pow Mio France
very small, also excavated
below head.

T. brevipes (M-E) 1869
data as above
(smaller than T. gallica)

T. phasianoides (M-E) 1869
data as above - very small

Boreortalis laesslei Brodkorb 1954
dist. tibia, Thomas Lawn, Fla.

B. pallidaris (A. Miller) 1944
carpus Thirtyfold Rosebud fm. So. Dak.

B. tantala (Wetmore) 1933 Condor p64
tibia Arikareean, Nebraska

B. sedfordi (L. Miller) 1952
carpus, see Holman 1961
up. mio Barstow

B. phengites (Wetmore) 1925
dist. humus PLIOCENE Neb.

Anisolornis excavatus Ameghino 1891
tarsus mid Mio Argentina

Oligocene

Cracidae

Pucrax brevipes Macdonald 1957
skel. Chadron So. Dak.

Taoperdix pesanseli (Gervais)
mid. skel. up Oligo, France

[Smaller than So. Dak form
Was larger than the French
Miocene Taoperdix]

Paracrax antiqua (Marsh) 1877
dist. humerus White River Calo.
(see also Shufeldt 1913 auk 39)

Palaeonossax senectus Wetmore 1956 Condor p. 234
humerus up Brule, So. Dak.

	So. Dak	Cyttonyx	Oreortyx	Mioryttyx
a Br. area below head from tip to ridge	8.75	3.85	5.0	10.4
b depth head ~~at bill~~	7.5	4.1	4.2	—
~~beglith~~ head at lip	9.3	5.5	6.2	13.6
c d Gr. head to ext tub.	14.0?	7.2	7.75	19.5?
Ratio ac	94.3%	70%	80.7%	74.3%
" ad	62.5%	53.5	64.5	53.3
" cd	66.4	76.4	80.0	69.6

Sharpsfur.
Gallform

Cf Condor 1941, vol. 43, no. 4 pp 184-195

Unidentified odontophorine - White River 01 150 mid 01 150 distend tarsus

Toxdot 1951 — smaller than Colinus or Lophortyx

~~Unidentified odontophorine~~ up. Pliv Benson Arig.

* Wetmore 1924 - Tapejas Oreotyx (pars endhumus) with chars. of Colinus (= C. hebbardi ? says Holman, but Brodkorb domit refs it under Drab species.

Dendrortyx? - San Josecito cave Miller 1943

femur larger + heavier than D. leucophrys

nicaraguae.

10.2 / 9.4 / 8 / 4 / 4 / 8 / 9 / 1 / 8 / 9 / 6 / 2 / 0 / 9.4 : 6.0 = X : 10.2 / 6X = 9.20 / X = 1.603

~~Colinus sp.~~

* Colinus sp. same as * above but a dist end tarsus no mention of size so presumably like other quail

Oreortyx picta Pliv P. Hu C, Cave Calif.
" " Samuel " "
" " Havana " "
Colinus virginianus Florida, Texas (1 loc.)
6 locs.

Lophortyx californica Calif. Pliv (5 locs.)
Cyrtonyx montezumae Pliv San Josecito
Odontophorus gujanensis Pliv Lime (4 cave deps.) Brazil
Callipepla squamata New Mex. (+ Ariz + Rec.)
Lophortyx gambelii Valle Nat, + New Mex cave

4.7 - 9.4
7.2 - 13.7
4.0 - 6.2

~~Lophortyx, one tarso-metatarsus, Pliv. Hu C, Cave, Calif.~~

~~its new large size~~ ~~and clearly~~ its clear ~~cut~~ odontophorine character & deeply undercut head coupled with its large size, immediately set it apart from all other fossil quails. ~~Only seven extinct fossil spp. of quail have been described (Brodkorb, 1964) are now recognized (Brodkorb, 1964). All other Gallinaceous fossils so far described~~ Brodkorbs' (1964) analysis of all previously described extinct galliforms resulted in the recognition of only seven properly assigned to the Odontophorinae. Only two, Miortyx teres Miller (1944) and Cyrtonyx cooki Wetmore (1934) are of Miocene age. All, regardless of age are notably smaller than Miortyx aldeni. The new species is named in honor of H. Miller, discoverer of the genus Miortyx, whose untimely death in 1965 has deprived ~~the world of a wealth of~~ one of the ~~richest~~ most valuable ~~fossil~~ contributors.

2.5/06

4) 1.8/20

1.92

4) 7.7

4/37

36/10

Tympanuchus stirtoni Brodkorb 1944 nisl?

* 2 largest 12.5 and 12.9

7.7

1.9

9.6

Nanortyx inexpectatus tarsus 5.2 mm. br. dist trochleae (said to be smaller than Paloortyx, Oreortyx, Callipepla or Cyrtonyx)

* Cyrtonyx cooki dist. humerus (br. 9.5 mm.) (1/4 larger than Cyrtonyx montezumae mearnsi which would make its prox br. about 12.5 mm.)

Cyrtonyx tedfordi Miller, 1957 nisl

* Miortyx teres prox humerus (br. 12.9 mm) about size of C. cooki

Leptortyx shufeldti prox humerus (br. 9.4 prox., 7.1-7.3 distal) also said to be very small (smaller than Colinus hibbardi, Cyrtonyx cooki T. C. tedfordi, & Miortyx teres.

Pleis Colinus siblium Brodkorb 1959, humerus prox br. 9.6-10.1
smaller than C. hibbardi Wetmore " dist br. 7.5-7.9

Pleis Colinus hibbardi Wetmore 1944 dist humerus (br. dist. 8.0 mm.)
prox br calculated to be about 10.4 mm

Pleis Neortyx peninsularis Holman femur length 45.8, br 7.5 prox, 7.6 dist, larger than Cyrtonyx montezumae, smaller than Rensortyx longipes femur is smaller ↗ probably humerus would equal fossil Odontophorus (3 sp.) Neortyx

Fossil galliformes in which humerus is indicated by

EOCENE

Palaeortyx blanchardi ME = Ludiortyx — " distinguished from the Perdrix by a triciptal fossa [illegible] broad & deep which is extended into the [illegible] of the articular head up to tip."

Palaeortyx occipitalis ME = Ludiortyx — The triciptal fossa is deeper than in Ortyx calif. (Gaillard refers a humerus with fossa triceps deeper than in Ortyx calif. also says it is deformed, obliquely on shaft UNLIKE Miortyx aldeni)

MIOCENE

Palaeortyx gallica ME = Taoperdix — humerus close to Ortyx & Cyrtonyx than to other galliforms. Has deep triciptal fossa as in these birds, a character not found in the Perdrix & in the Phasianids. The fossa extends under the head up to tip, even larger than in [illegible] Ortyx. In size - larger than calif. Quail, a little closer (in length) to Cyrtonyx cristatus.

Palaeortyx brevipes ME = Taoperdix — Triciptal fossa & humerus very deep & going up into the head up to tip. Size same as Calif Quail (humerus smaller than P. gallica.

EOCENE continued?

Palaeortyx calaxensis Lydekker — 9 mm p/ix another 10 mm. = Ludiortyx — Deltoid shows deep fossa, said to be less oblique than in P. occipitalis (but still more so than M. aldeni — also deeper)

Among the gallinaceous birds of the Miocene Eurasian [illegible], [illegible]

There are two species in which resemblance to the quails is particularly noted with regard to the undercutting of the humeral head by the fossa for the head of the triceps muscle (Milne-Edwards, 1869-1871, vol. 2: 232 and 236, pls. 127 and 128). These species were described by Milne Edwards as Palaortyx gallica and P. brevipes. They have since been assigned to the genus Taoperdix and allocated to the extinct subfamily Gallinulorninae, family Cracidae (Brodkorb 1964: 302). Both species are considerably smaller than Miortyx aldeni, and the humerus is further distinguished by deeper and more oblique depression of the fossa.

over for list

ME

blanchardi (1~~877~~ 80)

Palaeotyx ~~hoffmanni~~ has a very deep depression under the head of the humerus, undercutting the head & its tip, as in P. hoffmanni and P. gallica (Mio) (Eoc.)

~~Genus Palaeotyx (first described for P. hoffmanni Eocene)~~

Subg. Cryptonyx less deep tricipital fossa, (calls Cryptonyx a "roubrond"

P. hoffmanni length 89

P. blanchardi ~~prox 67~~ 12.~~7~~ 13. length ~~50~~

47 : 50 = 12 : x

47x = 600

x = 12.7

600 | 47
130 | 12.7
94
360

P gallica 10.1

tricip depression narrower + deeper (?) but has rounded head

P caylusensis Lydekker size of P. hoffmanni

P crypta smaller than blanchardi

P. brevipes small

P. edwardsi 55 mm humeral length, bag tricip fossa than in Cryptonyx = Palaeocryptonyx

P maxima coracoid 50 mm.

Diagnosis.-- Resembling Miortyx teres Miller in rounded head and deep cut ligamental furrow, but almost 50 per cent larger. Head deeply undercut; ~~shaft~~ below head broadly and evenly depressed, bordered externally by a longitudinal ridge presumably continuous from tip of pectoral scar (scar broken away); head less deflected palmad than in living genera of quails examined (Oreortyx, Lophortyx, Cyrtonyx, Callipepla, Colinus), with ~~distal~~ "lip" ~~of head region~~ consequently more prominently projected ~~palmad~~; pneumatic fossa more oval than round.

Measurements.-- Greatest breadth of proximal end, approximately 19.1 mm.; depth of head through projecting "lip", 9.0 mm.; depth of head external to "lip", 7.4 mm.; height of head to tip of "lip", 9.0 mm.

Remarks.-- The characters of longitudinal ridge at the external edge of the shaft and the oval pneumatic fossa may not be of specific value. Among recent quail genera, there is some individual variation in these areas. While the fragmentary condition of the fossil specimen makes it a poor choice for a type, ~~its~~ clearly odontophorine character of deeply undercut head, coupled with its large size immediately sets it apart from ~~all~~ other fossil ~~quail~~. Brodkorb (1964) analysis of all previously described extinct galliforms resulted in the recognition of only seven properly assigned to the Odontophorinae. ~~Only two, Miortyx teres Miller (1944) and Cyrtonyx cooki Wetmore (1934) are of Miocene age. All, regardless of age,~~ are notably smaller than Miortyx aldeni. ~~The largest,~~ Only two are of Miocene age; Miortyx teres Miller and Cyrtonyx cooki Wetmore. Miortyx teres, ~~is~~ the largest previously recorded species, measures only 12.9 mm. in proximal breadth.

Galliformes, re: Wounded Knee
humerus

	a Br. prox end	b Depth head at lip	c Depth head ext to lip	d Lit head at lip	distance med. curv to ext edge of groove	e distance from middle of top of lip to ext edge of shaft	ratios ba	cb	bd	ea	f Depth at capital groove	ratio fb	ca
Tetrao	19.1	9.0	7.4	9.0	10.0	8.4	47.1	82.3 ✓	100.0	44.0	8.1	90.0	
#926 partial Alectoris graeca	13.6	6.4	4.8	5.7	5.1	5.4	47.1	75.0	89.0	39.7	6.6	100.3	
Rallus #330 Rallus aquaticus	11.0	6.1	4.3	6.3	5.0	5.1	55.0	70.5	103.0	45.8	5.8	95.1	
Otis tyx #862	10.6	4.9	3.9	5.8	4.9	4.2	46.2	78.5	101.8	40.4	5.2	100.6	
Lophortyx #1822	9.0	4.5	3.6	5.2	3.9	4.2	50.0	80.1	101.5	46.6	4.3	95.7	
Cyrtonyx #1735	10.1	4.9	3.7	5.1	?	4.0	48.5	75.6	100.4	39.4	4.6	93.9	
Callipepla #1108	10.3	4.7	3.8	5.2		4.15	45.6	80.7	101.0	40.2	4.8	100.2	